PDS4 Tool Development Strategy

PDS Management Council Meeting
November 18, 2014

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PDS Tools

- Per PDS requirements in 1.5.x and 3.3.x, PDS will provide a set of core tools for mission, PDS, and user support of working with PDS4 data and standards
  - Both U.S. and international
- The PDS information model and associated representations will be provided to support pipeline and user tool development.
- For tools, we classify tools into
  - Core Tools, Mission/Data Supplier Tools, and User Tools

Core Tools

- Generation (1.5.1)
- Label Design (1.5.1)
- Label and Data Validation (1.5.2)
- PDS4 Library I/O (3.3.2)
- Inspection/Visualization (leverage COTS viz) (3.3.2, 3.3.5)
- Transformation (3.3.3)

Note: We consider the data management/infrastructure software to be services that drives and implements the PDS4 software architecture (e.g., 2.8.x). That is outside the scope of this discussion.

Build 5a Deliverables*

- <u>Software System</u>

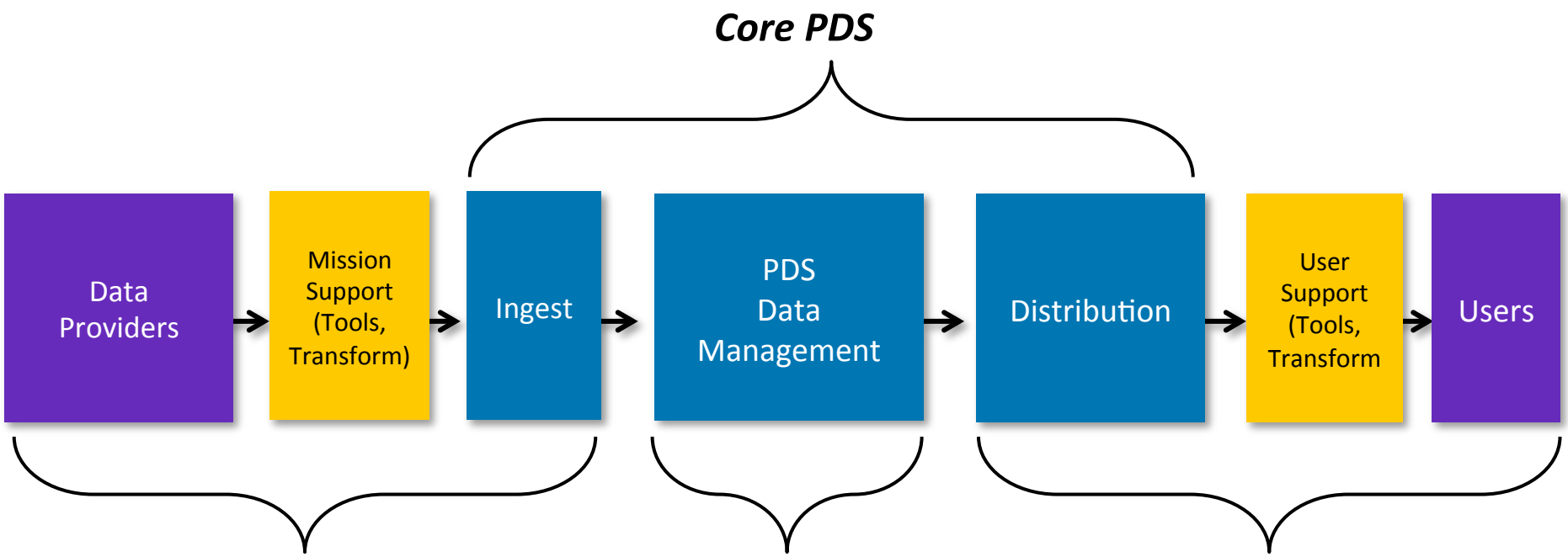
- Registry Service
- Harvest Tool
- Generate Tool *
- Validate Tool *
- Transformation Tool *
- PDS4 Libraries *
- Security Service
- Report Service
- Search Service
- Catalog Ingest Tool
- PDS Portal

- <u>Data Standards*</u>

- Information Model
- XML Schemas
- Data Dictionary
- Concepts Document
- Standards Reference
- Data Providers Handbook
- PDS4 Example Products

** Posted to http://pds.nasa.gov/pds4*

Challenge: End-to-End System and Data Integration

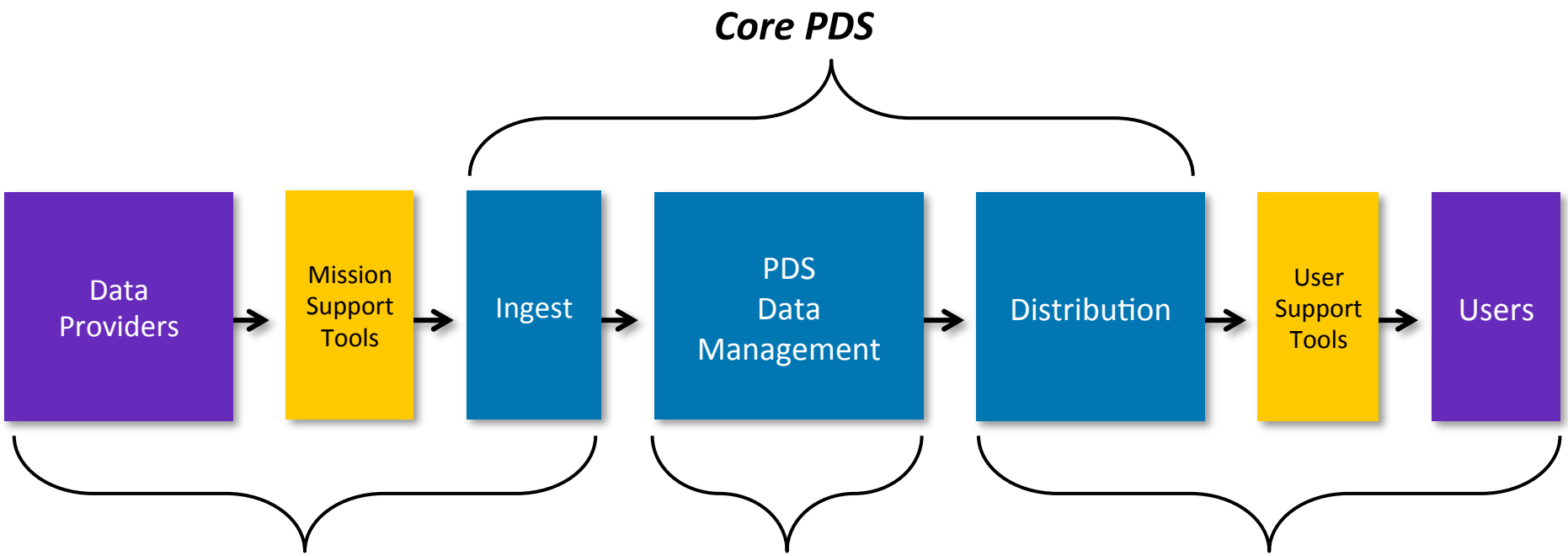


Improve efficiency and support to deliver high quality science products to PDS

Preserve and ensure the stability and integrity of PDS data

Improve user support and usability of the data in the archive

PDS Tool and Standards Strategy



Adopted by data provider

Core PDS Tools (Rqmt 1.5.x, 3.3.x)

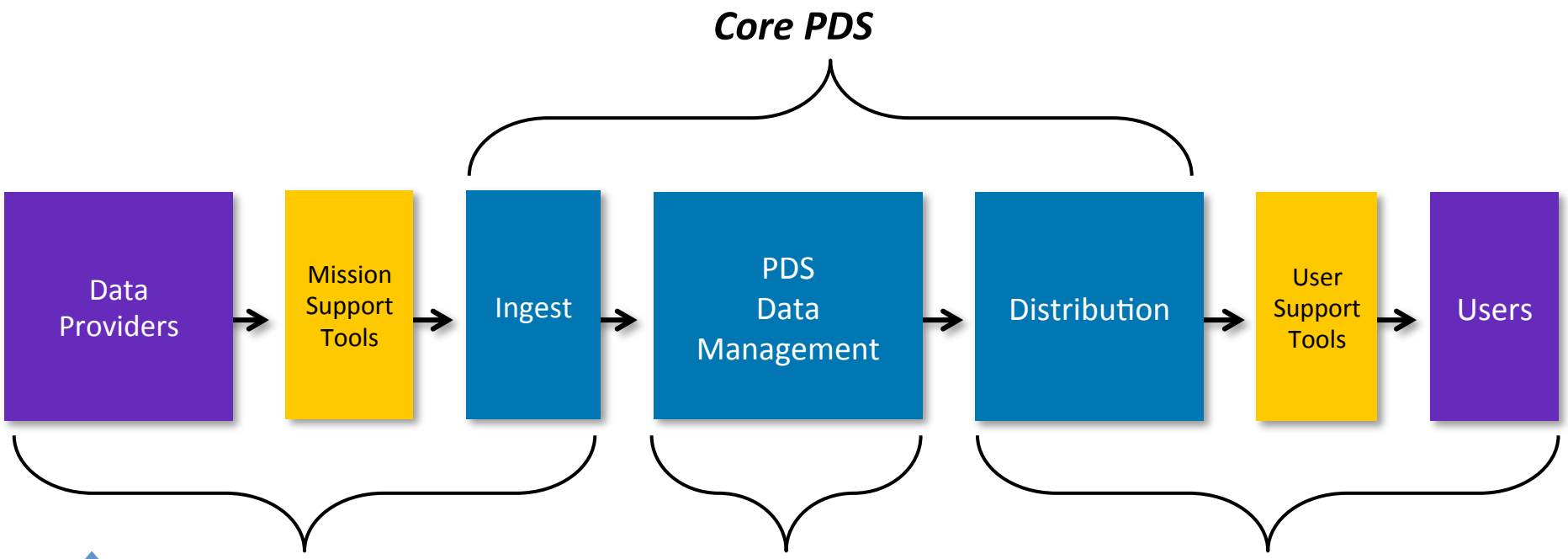
- Design
- Generate
- Validate
- Transform
- *Visualize*
- PDS4 Tools Library

Information Model

Mission Pipelines

User Support Tools

PDS Tool and Standards Strategy



Core PDS Tools (Rqmt 1.5.x, 3.3.x)

- Design
- Generate
- Validate
- Transform
- *Visualize*
- PDS4 Tools Library

Information Model (XML, RDF, JSON)

PDS, PSA, etc

Mission Pipeline Tools/Services

- AMMOS APPS
- Others

User Support Tools

Core Tools

PDS4 Core Tools

Tool	Tool Name	8/26/2014 and Oct MC Telecon Discussion	Status
Label Design Intended to be a GUI-based tool for designing PDS4 label templates that conform to the PDS master schema and any included Mission/Discipline-specific	Oxygen/Eclipse	The MC discussed that investments are already being made in this area. Two efforts are underway from AMMOS and ARC. There is no additional gaps identified.	COTS/Open Source
	GUI Tool		Available by AMMOS and ARC teams
Label Generation Software for generating PDS4 labels from existing PDS3 labels or a PDS4 DOM in bulk.	Generate Tool	The MC suggested that these two tools could be ultimately brought together and integrated into the a common PDS4 tool.	Generate tool Included in Build 5a
	pds.docgen		Available at PPI
Local Data Dictionary Generation Software for generating a Local Data Dictionary in the form of an XML Schema file that can be referenced by product labels.	LDDTool	LDDTool is being used fairly existensively. The orignial version was developed as a stopgap, however, it is now being improved to be integrated as a core software tool.	Included in Build 5a
Label and Data Validation Software for validating PDS4 product labels and product data. The associated specific schema for the product label specifies syntactic and semantic constraints. The product label itself specifies the constraints for the data.	Validate Tool	The MC discussed that one cannonical tool should be developed. IPDA also desires on valiation tool. Extensions are being planned to the validate tool in FY15.	Included in Build 5a
	Web-based Validator	The MC discussed a GUI-based interface with different options that would integrate with the validate tool including dumping a report for viewing by a open/COTS-based tool.	Not developed yet. ARC proposed.
Label and Data Transformation Software for reading and writing PDS4 data products that also includes transforming data and label files into various formats. See the Format Transformation sheet of this document for the list of requested transformations. (The Format Transformation list will be revisited including adding transformations from the System Services Requirements Discussion wiki page: https://oodt.jpl.nasa.gov/wiki/display/pdscollaboratio	PDS4 Tools	A core library for reading and writing PDS4 data products exists.	Included in Build 5a
	Transform Tool	The MC discussed the need to begin identifying different transformations beyond the current set that is provided for imaging and a few other basic data formats. It was also suggested that nodes work with EN to integrate other data formats into these tools. There was also some discussion about ensuring that XSLT and other transformation capabilities for making XML easier to read be made more readily available to the nodes.	Included in build 5a
Visualization Software for displaying and visualizing PDS data products. Intended to include functionality currently provided by NASAView and TBTool for PDS3 data products. See the Quick-look Display section on the System Services Requirements Discussion wiki page: https://oodt.jpl.nasa.gov/wiki/display/pdscollaboratio n/System+Services+Requirements+Discussion.	TBD	The MC felt that PDS should not develop its own visualization platform, but rather look to support the NASAView functionality by taking a PDS4 product and then ensuring that it can be displayed off the shelf tools. It was also suggested that ImageMagick could be used to provide this functionality. Most feel that havnig the functionality is important for supporting peer reviews and mechanims to do a quality check on the data.	Not developed yet.
Bundle Browser Software for browsing labels and data within a bundle. Includes incorporating capabilities for transforming labels and data to viewable formats from the Label and Data Transformation software.	TBD	*This was considered a low priority tool.*	Not developed yet.
PDS4 Data Dictionary Lookup Tool	TBD	At the IPDA meeting, ESA requested a PDS4 version of a data dictionary lookup tool. This is currently under development.	Planned for Build 5b.

Mission and User Tools

- PDS developed tools
  - Generally by the DNs, particularly User Tools
- Externally developed tools
  - Examples: APPS pipeline, LMMP lunar search/viz
- In all cases, PDS should provide the core foundation through PDS4

Mission and User Tools

- ATMOS Data Migration Tool
  - Used to migrate PHX (MET, LIDRA, ASE, AO, TT) and MRO (ACC) data
- IMG Data Migration/Generate Tool
  - Used to test migrate MPF (IMP) and Clementine basemap data
  - Incorporated into the APP and Transform Tool for PDS4 label generation
- SBN Data Migration Tool
  - Used to generate LADEE LDEX archive bundle
- SBN OLAF
  - In development to update OLAF to generate PDS4 data
- ARC Table Slicer
  - PDS3 and PDS4 now available

PDS-AMMOS Collaboration

Supplied (PDS + AMMOS tools)

AMMOS Pipeline Service (APPS)

Supplied

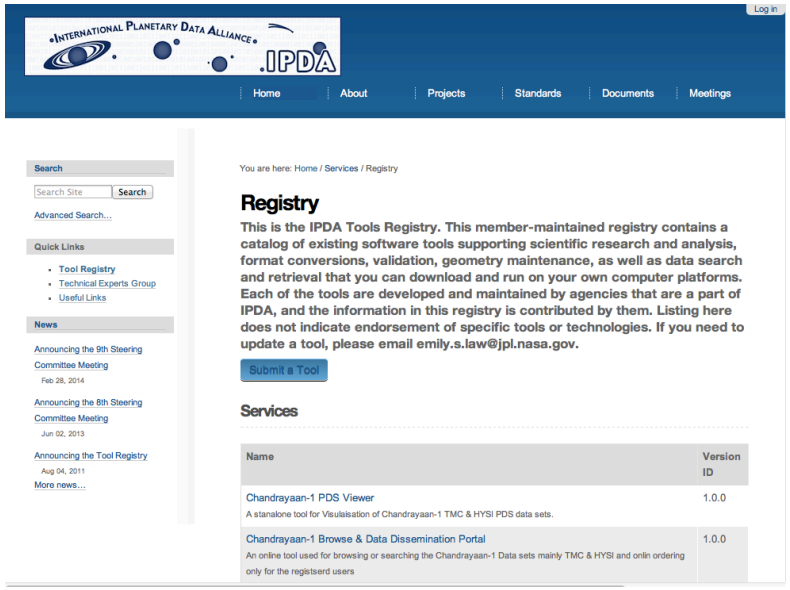
PDS4 Tools

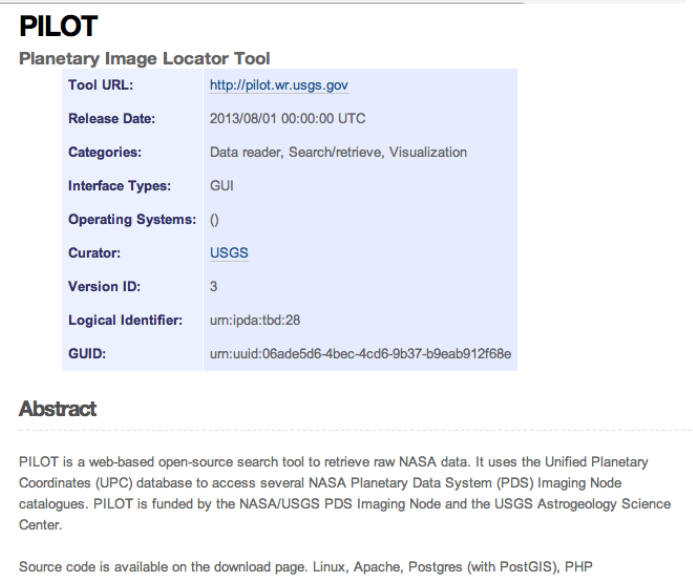
- Generate
- Validate
- Transform
- LDDTool
- PDS4 Tools Library

Information Model (JSON)

International Collaborations

- IPDA working closely with PDS on tools
- Per the IPDA Steering Committee, members will be assessing existing PDS4 core tools this year for any gaps
  - Part of the PDS4 Implementation IPDA Project led by Santa Martinez (ESA/PSA)
  - In particular, to drive a canonical validation (a key PSA goal)
- IPDA also interested in sharing their tools through a common registry
  - Tom Stein led an IPDA project prototype on this using the PDS4 registry infrastructure
  - Member agencies supplied lists of tools
  - https://planetarydata.org/services/registry
  - RSS based interface for publishing tool registry





Tool Coordination

- 2014-10-20/a (Crichton, ASAP): Determine best way for non-JPL personnel to help with definition and evaluation of PDS4 software tools.

- Proposal
  - Hold all tech virtual meetings where existing and planned tools are scrubbed
  - Timing can be negotiated; would be good to do prior to each MC F2F

Path Forward

- Core tools are derived from the PDS level 1,2,3 requirements and tightly integrated with the PDS4 information model
  - Form the basis for deliveries to PDS; PDS archive mgmt; user tools
  - These should be part of the PDS CM; rolled out on builds
  - Broadly shared (including international)

- PDS tools and standards pushed to data providers and users through release process

- EN will continue to manage the core tool plan; will work with nodes on mission and user tools
  - Intend to include in the EN matrix that we send out
  - Plan virtual meetings

- Integrate tool registry into pds.nasa.gov for planetary science community
  - Search tools already integrated; can continue to add more
  - Mission and user tool pilot developed by IPDA based on PDS4 registry infrastructure
  - Formalize tool registry and be ready for the next PDS Data Workshop
  - Will need to actively manage to deal with obsolete tools